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Summary report of pilot study of 10 universities outstanding in educational research. Reports and comments upon responses of deans and faculty to such questions as: What is being done to provide a favorable research climate? How is faculty time assigned for research? How does one distinguish between good and poor research?

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First Annual Symposium on Educational Research
Phi Delta Kappa, Inc.
Bloomington, Ind. 1960

Chapter I

A Survey of Educational Research at Selected Universities

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This survey is part of Phase I of a broader study of educational research in the United States.[1]

I. THE NEED FOR EDUCATIONAL RESEARCH

American schools during the past century can claim a significant share in the development of the United States. They fused a variety of foreign nationalities, cultures, and creeds into a united nation, brought us to a position of world leadership, and gave us an unparalleled standard of living. Today's schools can claim credit for great improvement over those of even a generation ago. Reading, arithmetic, language arts, and other school subjects are taught far better. Students of comparable ability learn more and learn it faster. Whenever data are available for comparisons, schools of today usually prove more effective. In these developments, educational research can claim a proud share. But measured against what our national responsibilities and resources call for, our schools are ineffective indeed. Until October 4, 1957, our position of technical leadership was rarely challenged directly, so far as the general public was concerned. Complacency was, and still is, reflected in grudging financial support of schools and certain anti-intellectual attitudes. The post-sputnik period was ushered in with a flood of criticisms

[1]This study is being supported in part by funds from the Cooperative Research Program of the U. S. Office of Education. The opinions expressed, however, are those of the author.

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of education by the press and certain other interests and groups. This scapegoat mechanism probably reflected the uneasiness associated with feelings of insecurity more than a basic distrust of public education. Science budgets were increased markedly, funds were made available for summer and other teacher's institutes in science and mathematics, and scientific societies for the first time began to exhibit a serious interest in the content and processes of public education. While these efforts are commendable, it is doubtful whether they will solve the underlying problem, since they are aimed at a few of the more prominent symptoms rather than at more fundamental causes.

In man's struggle to live happily in an increasingly complex world and to improve his lot, education has always been recognized as an important ally. In recent years the tremendous acceleration of scientific and technical development has left our public comprehension far behind. Unfortunately, it also left behind the comprehension of our leaders. The depletion of natural resources, particularly energy fuels, at the time of explosive population growth, coupled with the emergence of new social, political, and economic forces in Asia and Africa, has inevitably imposed a need for ever increasing complexity.

Education is needed in maintaining the supply of qualified and trained manpower not only in technology, but, more important, in those aspects of our world that make life worth living. Whether we like it or not, education will have to change markedly. Demands for ability, knowledge, and skill will have to be radically upgraded. This would be fine if all our pupils were geniuses, but when nature does not supply enough talented people education must make up the deficiency. Our national interest and well-being demand increased efficiency of the schools. Development of more timely and accurate science and mathematics instructional materials, institutes for upgrading the knowledge of teachers, increased laboratory and library resources are certainly desirable but are "too little and too late." These stopgaps take little cognizance of more basic problems of quality control in education.

Critics have suggested that the efforts of educators have not been such as to lend confidence in their leadership. Certain people, both outside and within education, have claimed that changes

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in education tend to come through accidental or incidental innovation rather than evolving in orderly fashion from a systematic body of organized knowledge. Educational problems are said to be solved by opinions, arguments, and debate rather than by facts and research. Frequently the very basis for research seems to be lacking.[2]

It is the purpose of this paper to report some results of a pilot study of universities selected because they were outstanding in educational research. Even if these schools were taken as typical of all schools, it cannot be said that these criticisms are baseless.

II. Plan of the Study

Information was collected and summarized around questions dealing with: kinds of studies and activities called educational research; the persons doing educational research—their background and preparation; the processes and procedures used; the incentives or climate provided by the institution to encourage research; the facilities and other support provided for educational research; the kinds of research that interviewees thought should be encouraged; the extent of cross-cultural or interdisciplinary exchange of promising ideas, tools, techniques, and data; the suggested means for improving current educational research; the goals and achievements of educational research; the feeling of educational researchers about the status of their work; suggestions for distinguishing what is good from what is shoddy in educational research; the organization of educational research within the institutions—kind, extent of formal structure, and services provided; recruitment, selection, and development of

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[2] F. G. Cornell and E. P. McLoone, *Review of Educational Research*, 25:351-363, 1955.

"During the three-year period there has been very little of the theoretically oriented type of research designed to provide new perspectives or new practical methods of financing education or managing school systems."

A. D. Simpson, *Review of Educational Research*, 20:135-141, 1950.

"The publications strictly classifiable as research in the fields represented in this chapter are chiefly characterized by their scarcity. The author has now served as a committee member for five numbers of the *Review*. . . . The story has too often been the same, particularly with the topics covered here."

desirable graduate students; the extent of financial support of educational research. Of necessity, much of the information consists of opinions, impressions, and attitudes of the research workers interviewed.

The general plan was to do the pilot study by visits to the selected institutions. Data were collected by interviews; observation; and documentary analysis of college catalogs, available committee reports, etc. In the initial sample ten universities were selected on the basis of an index based on summed ranks of (a) judgments of three experts as to the amount and level of educational research done by the faculty, (b) number of research publications listed in the *Educational Index* during the period 1950-56, (c) graduate enrollment, (d) number of doctorates granted in education during the period 1950-58.

Interviews were begun with the dean and other responsible administrators. After responses to the dean's schedule had been obtained, he was asked to designate the members of his faculty who were doing, or had just completed within the last three months, research in education. Interviews were scheduled with these individuals and with those whom they designated. About one-fourth of the people interviewed were in divisions other than education.

Although responses were obtained in terms of a prepared interview schedule, these data are usually expressions of an impression, opinion, or the information that was on hand at the time of the interview. No reliability check was made. Over 200 people were interviewed. The summary below reflects the subjectivity of the data and the author's selection of materials. The discussion below does not cover all the questions included in the interviews.

III. Summary of Data from Deans

Dean's Questions:

1. *What is being done to provide a favorable research climate?*

What are the facilities: consulting, computing, and data processing services; clerical services for typing, scoring tests, collecting and summarizing routine information?

Many things are done. These include:

a. Providing facilities and conditions that encourage research by released time from teaching for research, adequate salary, promotions, research assistance, funds for research costs, consultative services, library and other necessary materials.

b. Faculty committees that assist with mechanics of applying for grants, administering research budgets, and assisting specific research projects; faculty interaction and communication that encourage rather than restrict identification and development of research upon significant problems.

c. Administrative procedures that encourage the discussion of research problems and specific projects, the maintenance of channels of communication about research, the publication and critical review of research studies, the employment of a staff with research competence, and the provision of financial and social rewards for research of high quality.

d. Employing and encouraging faculty members who strive for scholarship in their respective fields; manifest genuine interest in and are productive in research; emphasize scholarship and research in their teaching; know actual problems or operations in education to which their research relates; invest their primary research effort in studies of a basic nature; constantly stress the importance of their own, their students', and their institution's research; continuously and realistically appraise their own efforts and competence as well as those of others; do not undertake or direct research for which they are not competent; continuously review and appraise the procedures used in training research workers and the climate of research present on the campus.

Comment:

These are verbalized comments and are just what one would have predicted as responses to this sort of question. The fact that a dean may be fluent in giving many of these kinds of re-

sponses may not necessarily indicate that he vigorously supports such measures. The general impression was that the deans in all the institutions visited were sincerely convinced of the importance of educational research and actively attempted to do something about it. In fact, because of the selection procedures used, any other pattern of response would have been most surprising.

However, the impression persists that even in these selected institutions there were wide individual variations in the extent and direction of administrative activity in support of educational research, but no attempt was made to quantify this impression. Some deans were content to pay verbal homage to the encouragement and support of research, and then get on either with their own research or with other tasks that are required of administrators.

The role of a dean actively promoting favorable public attitudes toward research was manifested by only one dean. This dean organized a Citizens' Conference in Educational Research where influential citizens and public officials participated—governor of the state, members of the legislature, the leaders of the various professional educational organizations. The need for financial support of educational research was vigorously promoted. This dean has also been a vigorous spokesman for educational research in his public appearances. His success in obtaining financial support for educational research should be of interest to those who complain about public apathy in the support of educational research.

So long as educational research is dependent upon the public for its support, it would be encouraging to see more effort directed toward informing that public as to the significance and importance of educational research. Perhaps this may seem to be beneath the dignity of some administrators, but it is an essential function so long as we live in a republic.

Perhaps a digression into the support of educational research as compared to other research may be useful at this point. Business and industry, according to the vice president of Arthur D. Little, Inc., invests at least five per cent of its budget in research. Education spends less than five one-hundreths of one per cent for research.

Governmental expenditures for research[3] are indicated, in millions of dollars, as follows:

	1950	1955	1960 (estimated)
Research and Development for National Security	871	1804	4572
Other	209	281	912

The Office of Education Cooperative Research Program budget for fiscal 1960 is about 3.2 million or about .03 per cent of the "other" research and development item. Budgets of state and city school systems for educational research are usually established at a much lower rate than this.

Discussions about educational research claim that potentially

> It can test theory explicitly before costly expenditures are made for programs. It can take the practice out of trial and error. It can show how to produce a better product, more efficiently and with greater economy. Yes, educational research, like research in other fields, can save money; it can increase the educational returns on our investments for schools. Sound educational research is desperately needed in these times to help produce better teachers, better schools, and better citizens. Investments in educational research undergird our national security and contribute to continued freedom of our people.[4]

When one examines the budgets for educational research in relation to the needs for it, one is disappointed, to say the least.

2. *How are the budget funds distributed among the functions of instruction, extension and public service, and research?*

Only five institutions gave usable data with reference to this question. These were distributed as follows:

	Institutions				
	A	B	C	D	E
Instruction	76.5	76.3	71.3	63.5	51.0
Extension and public service	2.6	3.2	3.2	7.6	16.4
Research	20.9	20.5	25.5	28.9	32.6

[3]Committee on Economic Development, *The Budget and Economic Growth*. New York 22, 1959.

[4]Dean L. J. Stiles, University of Wisconsin, July 1958.

The reader is warned that comparisons between institutions are hazardous because the items included under each heading are not necessarily equivalent. The point that is clear, however, is that in the selected schools research receives a larger share of the budget than extension and public service. In schools not so well known for their research activity, this relationship is usually reversed.[5]

3. *How is faculty time assigned for research?*

It was thought that a better perspective might be obtained by obtaining time distribution data on all of the faculty.

INSTITUTION A.

	Time Assigned for Research						
	0%	1-24%	25-49%	50-74%	75-99%	100%	Total
Professors	21	7	7	3	5	2	45
Assoc. Prof.	10	4	5	1	2	1	23
Asst. Prof.	14	3	2	2	1	3	25
Instructors	7	0	0	0	0	0	7
Lecturers	1	0	0	3	1	0	5
Associates	2	0	1	0	2	3	8
Assistants	66	1	4	27	0	5	103
No Rank	2	0	1	0	0	0	3
	123	15	20	36	11	14	219

[5] *A Re-study of the Needs of California in Higher Education.* California State Department of Education, Sacramento, 1955. Also, the California Big Ten Cost Study.

Also, H. G. Badger and M. C. Rice, "Statistics of Higher Education: Receipts, Expenditures and Property, 1951-52," *Biennial Survey of Education in the U. S.*, USOE, 1955. Of all the money available for research, 82 per cent was expended by universities, 14 per cent by technical schools, 3 per cent by liberal arts colleges, and 1 per cent by professional schools. Colleges commonly known as teachers colleges, whose primary function is the preparation of elementary and secondary teachers, spent $85,700 for research, or less than .03 per cent of the total research expenditures in higher education.

INSTITUTION B.

	Time Assigned for Research					
	Under 25%	25-49%	50-74%	75-99%	100%	Total
Professors	27	5	1	0	2	35
Assoc. Prof.	21	0	0	0	0	21
Asst. Prof.	22	0	1	0	0	23
Instructors	53	0	0	0	0	53
Lecturers	3	0	0	0	0	3
Associates	1	1	1	0	3	6
Assistants	0	12	10	0	0	22
No Rank	0	0	1	0	0	1
	127	18	14	0	5	164

These data were collected under the assumption that schools which valued research most would make such provision in the allocation of faculty time for research. This may be a valid assumption in some schools, but it is unwarranted in other schools. To make these data comparable one must make sure that the teaching load is essentially the same between institutions, i.e., a professor teaching seven hours would be listed in the zero column if the basic load was seven hours at his institution, and would be listed as having been assigned 50 per cent time off for research where the teaching load was fourteen hours. There are also such considerations as how demanding are the preparations for teaching and what are the standards of classroom lecturing at the institution that must be taken into consideration. Among the universities visited, only the two distributions given above were regarded as sufficiently comparable to warrant presentation of the data.

The data indicate that even in the institutions selected because of their research activities, most of the faculty members are officially assigned little or no time for research.

4. *What is the research significance of faculty publications?*

Listings of faculty publications indicate that many of the publications are not research. They are usually editorials, book reviews, textbooks, or narrations about a point of view. The range of publications within an institution that might be called

research runs between one-fifth and two-thirds, and this is irrespective of the level of the research published.

Comment on Dean's Questions:

It was originally thought that the interview might be used as a means of data collecting, and the interview schedule was designed to obtain data that were relevant to the importance that the institution attached to research as a faculty activity. Actual experience in doing the interviews suggests that this is essentially an exploratory activity that does not yield comparable data. However, it does provide suggestions as to the variations found among schools, and the need for reaching a common denominator before the data can be said to be reasonably comparable. In other words, these data reflect within-institutional characteristics; it is hazardous to regard them as reflecting between-institutional practices except to a gross and unknown degree.

Summary of Data from Faculty:

Individual faculty members were asked two sets of questions. The first set dealt with a case history of a current or a recently completed research project. This included (a) the background of the problem—what did it grow out of, its conceptual context or frame of reference; (b) specific questions currently being studied—deductions from the frame of reference, hypotheses being studied; (c) tools, techniques, devices, designs, tests, or methods used in collecting data, and nature of data collected; (d) analyses of data; (e) interpretation of findings in relation to frame of reference and their impact thereon—indication of revisions of frame of reference, new concepts, new hypotheses, questions, suggestions for new data, tools, techniques, instruments, devices, methods of procedure and analysis; (f) publications.

This block of questions was designed to identify the strategy and tactics used in educational research, and the likelihood that these would lead to cumulative development of systematic knowledge. A summary of this section is impossible within the time and space available. The impression of the author is that these case histories show a much more substantial basis for accumulation of knowledge than is usually evident in published research.

The second set of questions dealt with the faculty member's ideas on the question, what is educational research? What criteria

or standards does he use for distinguishing good from mediocre or poor educational research? What is adequate preparation of educational research workers—selection, course requirements, and research training experience? What aspects or developments in his field of interest appear to be most worthy for future development, or what trends seem to deserve support and emphasis in the future?

1. *What is educational research?*

"Educational research encompasses almost every sort of activity from the use of reference books by elementary school pupils to the most rigorous and systematic experimentation by research personnel."

". . . Educational research is the activity that is directed toward the development of an organized body of knowledge about events with which educators are concerned. A scientific body of knowledge should enable the educator to determine just what teaching and other learning conditions to provide in order to produce desirable aspects of learned behavior among those who attend school. Learning conditions will have to be suited to the aptitudes and other characteristics of the learner."

"The kinds of problems dealt with by educational research include—development research, curriculum research, research related to sociological and economic conditions affecting education to [the individual's] teaching."

"Educational research has ceased to exist. A large number of people are doing small studies, essentially amateur jobs that are not expected to influence anybody. Their value may lie in relation to [the individual's] teaching."

"The educational research spectrum includes:

"a. Fundamental research that could be equally well done in one of the academic fields or behavioral sciences. The reward structure of universities is such that it gets you more than other types, and tends to crowd out applied research. Conclusions of this research should be relevant to educational method.

"b. Work on educational principles, i.e., Brownell's work done in a classroom with classroom materials.

"c. Development research designed to produce instructional materials in a form to be used in the classroom–the Illinois and Yale math projects and the MIT physics project.

"d. Operational research or activity associated with the operation of an enterprise–selection test for candidates to veterinary college, surveys, etc., where no attempt is made to generalize."

"There is too little evidence-gathering on all sides."

"In education we need to look at the academic fields. The social wisdom of having all educational research done by educational researchers is questionable. People who want to do theoretical or long continued research are better off in an academic field like psychology in terms of stimulation, where they can go as deeply as they want. . . .One must constantly balance a scholarly career against getting something done in education."

"What do we seek out of educational research? . . .

"a. We seek to clarify as best we can the task that lies before us as educators. What are we trying to do? This turns out to be an unusually stubborn and difficult question despite all the wrestling with it by educational policies commissions and others. Are we trying chiefly to sharpen the tools whereby our pupils can play their respective roles in life? Or are we going beyond this to make them enlarge their vision as to what their roles might be? How we answer these first questions determines how we answer the second group.

"b. We try to discover how best we can achieve the ends we seek within the limitations imposed upon us by our communities, by the children who come to us, by those of us who teach. I wish to stress that because of these limitations education is an applied science and does not go on in a vacuum."

"We can do some kinds of research by *impoverishing* the situation. Thus we can study eye movements in reading by fitting the head into a frame and limiting the material which can be read. . . . so as to interfere as little as possible with photographing eye movements. Such experiments are good science, but my impression is that they have not served education very well because of their very impoverishment. They can tell us nothing

about such important aspects of reading as how the child selects a book from the library. . . . The *literal* level of educational research is represented by rather plain and matter-of-fact studies of educational attainment, say the collection of norms on tests. . . . This, too, is useful but it has lacked something that we need.

"The enriched level of educational research requires that we study what is happening in school and community in some total fashion. Skill learning in the school may depend on the aspirations of different socio-economic classes, on the extent to which teachers understand these differences, as well as on teaching materials and methods."

"Educational research is conceived to include all forms of scholarly work aimed at discovering new knowledge at or making creative interpretations, organizations, or applications of this knowledge. It may involve experiments in the laboratory, clinic, or classroom requiring considerable apparatus and equipment; it may be abstract and theoretical, demanding few facilities beyond paper and pencil."

Comment:

Educational research is different things to different people. The boundaries are those of the school or educational situation. Educational research appears to be willing to assume responsibility for all phases of scholarly activity associated with the educative process.

It thus includes:

a. Carefully designed experimental studies that provide a critical test of current or proposed practices. Other types of studies, including surveys, may also contribute usefully when new approaches or techniques are used, but mass collections of data, not illumined by some guiding ideas, should be discouraged.

b. Contributions of a theoretical, historical, philosophical, or integrative type as scholarly activities. Conceptualizations of areas of research to provide a general rationale or framework for studies that encourage a wise utilization of research effort.

c. Critical reviews of research literature and summaries of issues and problems.

d. Applied research, focused on local practices and policies, that is planned to stimulate interest in more fundamental studies, as well as to develop the school staff and illumine some immediate problem. This activity would be directed toward becoming operations or logistics research. The writing of textbooks, preparation of intructional materials, and administration of a school seem to be relevant activities when impelled by more basic considerations than those of the immediate situation.

Educational research seems to have rather fluid boundaries. One is forced to the banal, if not actually tautological, operational definition that educational research appears to be what educational researchers do.

The activities of researchers interviewed in the pilot study exhibit a different picture from that reported by Ryans[6] as typical in the activities of research offices. It is activity of these rather than the typical researcher that the definition might stress.

2. *How does one distinguish between good and poor research?*

Items listed below that are not in quotes have been edited to reduce their length. An attempt has been made to preserve the intent of the interviewee.

This distinction usually emphasized an appraisal of the product or end result rather than the process by which it was reached. In research, however, one cannot necessarily predict

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[6]D. G. Ryans, *Journal of Educational Research*, 49: 195-202, 1955; and *Elementary School Journal*, 58:9-15, 1957, *Journal of Educational Research*, 51:173-184, 1957. In the latter study the activities of research offices are summarized under:

a. *services and accounting*—pupil record keeping, preparation of budgets, preparation of salary schedules;
b. *supervisory activities*—conduct of curriculum planning, guidance services;
c. *conduct of public relations;*
d. *demonstrations;*
e. *action research;*
f. *school surveys*—community survey for a new school building, testing survey, financial survey;
g. *correlational studies*—prediction studies;
h. *educational rationalization*—searching for and retaining only evidence in favor of a current practice;
i. *experimental studies*—ranging in sophistication from the relatively naive to the sophisticated.

that a given study will yield positive results, hence the level at which the researcher works also needs to be considered. Essential distinctions in the research process were made in terms of the level at which a professionally mature researcher could be expected to work. Sometimes the mature research worker himself did not function at his level, especially if he was on unfamiliar ground, in a hurry, or disturbed by the results.

A good study puts us ahead of where we are now, tackles problems not handled by peers, solves problems that others have failed to solve. A good study makes a difference in educational practice if the potential applications are taken seriously. A good study is imaginative, ingenious, and productive of new approaches, new ideas, and new data. A good study fits into a pattern of long range work. It has antecedents and consequents, and the total result is increased understanding of a field as a result of the accumulation of studies.

A good study is carefully designed and planned. It identifies a definite problem. All parts of the procedure are relevant to the question being studied—data collected, analysis of data. The interpretation of findings or meanings of results is directly related to the organization of the study and the procedures used. The results are also directly related to the conceptualization used, and may suggest new data and new concepts.

A good study is aimed at discovering truth, not at supporting a current or proposed practice. It deals with more general and universal aspects of questions that concern education. The goal is not to find a quick solution but to develop tested principles. Results of a good study can be communicated to peers working in the same area.

A good study is appropriate to the level of development of its field and to the questions asked. Education is an enormous public enterprise engaged in a form of mass production. It is impossible to operate on this scale without systematic quality control, for without quality control we don't know where we stand, and we cannot correct the weak spots. A program of quality control involves systematic and continuous collection of facts on pupils, including long term follow-up of graduates. Data would include tests but would also include data on motivation, socio-economic background, level of aspiration, emotionality,

etc. Operations research tells the school about its raw material and about its output. Operations research and quality control methods could be applied to operational data.

Poor studies consider an unimportant problem, are improperly designed, are over-generalized, or improperly done. They include trivial studies or those that have been done so often that there is no use doing them again—correlations between ACE, high school ranks, etc., and college grades.

In educational research the objection to a study is not that the data are not as precise as laboratory experiments, because one recognizes that education data have a high variability built into them. The objection is that such studies are often *ex post facto;* i.e., "what happens to high ability youth?"

A poor study doesn't account for enough of the variance, has an insufficient number of independent variables, or permits little identification of variations. Such studies are often repetitious and naive, often definitely clerical in level of manipulations.

Clear, precise studies of learning under various treatments appeal to natural scientists. But many studies lack a central problem, or have no theoretical formulation and no comprehension of why they may be important.

Many education studies are trivial or axiomatic. Investigators often just pick up variables that happen to be around, precise identification of dependent and independent variables is lacking, and they often miss variables entirely or fail to name them.

Poor studies are illustrated by some of those in the productivity of groups. One gets a correlation of .70; one can choose any variables and still get the same correlation. The basic failure is in not understanding what the relevant variables are.

Comment:

Distinguishing between good and poor research on an overall basis is difficult to accomplish and to communicate. Since the quality of studies differs in many characteristics rather than on an all-or-none basis, general distinctions properly lead to substantial differences of opinion. Within his own frame of reference, a researcher can readily make distinctions between good and poor studies. Difficulty arises when he attempts to com-

municate these distinctions to others. The case histories of research projects given by the interviewees appear to exhibit sufficient similarity in level of scholarship, persistence, conformity to criteria of intellectual integrity, knowledge of the field, command of research techniques, tools, and methodology, etc., to warrant an attempt at communication. To succeed would require that the distinctions be reduced to some definite bases. A set of evaluative criteria could be developed and each illustrated by specific examples. These materials could be submitted to a jury of peers for appraisal. Resulting data could determine feasibility of the attempt. If the data exhibited desirable characteristics, further study using a scaling technique might be pursued. Such an effort would be useful during the training of research workers, or in conjunction with their training. Editors of journals and other professional publications and administrators of research grants might also find these criteria useful. However, competently trained researchers could probably spend their time to better advantage pursuing their own research rather than evaluating that of others.

3. *What is adequate preparation for educational research (selection, courses, and research experiences)?*

Selection: Traditional criteria for selection such as high intelligence and a high undergraduate record alone do not provide a desirably accurate or comprehensive base. Other predictors that should be investigated include originality, creativity and imagination, curiosity and enjoyment of intellectual exploration, independence of investigation and thought, persistence in carrying on projects to completion. Motivation toward research is very important and should be considered.

Courses: Comments favored the following: The program of training research workers should take account of the students' abilities and interests, and the institution's faculty and other resources. There might be some combinations of the following components in course offerings: a set of service courses wherein the faculty discusses its conception of the theory and practice of education, the body of knowledge in education and from the behavioral sciences bearing on the areas of concentration, the research techniques and procedures used in this field; a series

of seminars where professors describe their research projects and where participants actively appraise and criticize; a series of opportunities for students to formulate and test their own research approaches. The emphasis appears to be put not so much on courses as upon capability of the faculty, institutional climate, and resources for research.

Several interviewees doubted that the greater the student's mastery of statistical and other tools the more effective he would be in research, or that the greater his scholarly knowledge of the field the more likely he would be to contribute to that knowledge. They also doubted that the value of theory increased as it became more formalized and detailed. The importance of these elements was not belittled. "Statistical competence, scholarship, and theoretical sophistication are all important in research. The point is that each of these should be means toward the end of contribution to knowledge, not ends in themselves. The danger is that the individual will become so enamoured of statistical techniques that they largely determine his research decisions, . . . The danger is also that so much time will be spent in mastery of these means that too little time will be left for other experience crucial to the development of a creative researcher. . . ." "Competence in tool subjects or skills such as mathematics, foreign languages, electronics, physiology, etc., should be required of individuals where and as needed, but required in depth rather than as across the board hurdles that all must meet."

Others indicated that "education is not set up to train educational research workers. If one is training for research, he needs to have the student in a research atmosphere. Research people come in bunches like grapes. In schools of education, a research person is unhappy—he needs facilities, library, assistants, equipment. The student is put into a curriculum and experiences isolated from research contact, loaded up with course work." Still others indicated that graduate training in education is directed toward a professional goal, usually teaching or administration. Research is often only a peripheral activity. There is no graduate school that specifically prepares professional educational research workers.

Another suggests that "successful educational research does not reflect any particular training. Select twenty-five people

doing educational research, find their career route and you will note that background of training makes little difference. The problem is one of recruitment and seduction of competent people, rather than of the training program. Study the jobs—what are the roles in which educational research has gotten performed—Cronbach, Tyler, Brownell, Neal Gross. The job role is more significant than training when you have outstanding people."

Research experience in training: No dissents were observed with respect to the importance of research experience during training. Most people assigned this phase primary importance. Some cautioned that the significance of this experience depended on the nature of the faculty, their interests and productivity, upon student interest, and upon student-faculty compatibility.

"Education for research must do more than develop competence in designing, executing, and interpreting studies. Developing such competence is important, but much more so is the development of the individual's creativeness—his ability to discover new relations, to reformulate or systematize known facts, to devise new techniques and new approaches to problems."

For the teacher or administrator "one can specify a range of problems with which he will have to deal and the substantive knowledge, methods, and techniques likely to be relevant. Standardization of preparation for such jobs has much to recommend it. In contrast, research is always concerned with search for new knowledge and there are no clear-cut rules for finding it. . . . It is our belief that the education of the research student must be largely in terms of the interests and aptitudes of the individual."

"In training for research we should be interested in developing researchers who know how to do research and who continue to do so. One is most likely to sustain a productive research career if he has found research satisfying."

"The task of the researcher is not mainly that of designing a study, collecting data, analyzing results, or drawing conclusions . . . this is not what makes the difference between run-of-the-mill and significant work." Confirmatory activities constitute but a small part of the process of active research, and mostly in the terminal phase."

"Creative activities are often informal, sometimes illogical, and far from neat looking. They include a great deal of floundering, pilot studies, exploratory research. Numerous leads and ideas are developed. Most of these are rejected outright, some are followed up. . . . If an idea followed happens to be poor, a lot of time is wasted. If it happens to be good, the researcher may make a positive contribution. Between the idea and the contribution lie a lot of originality, intuition, persistence, and hard work. It is this sort of activity that comes first in time, or there is little worth processing by the confirmatory activities. The job is rarely finished by doing an experiment and finding significant differences. Making a contribution is a process of continuous work during which ideas change and develop."

The following comment provides a summary to the matter of training for research:

"Central to education for research is a faculty which itself is actually doing research. With such a faculty formal course work can usefully supplement the development of researchers through the internship. In the absence of such a faculty and thus the absence of meaningful internship, preoccupation with the improvement of courses offered or of various formal requirements can contribute little to what is crucial to research training."

Concluding Statement

Data reported here are inherently incomplete in terms of giving a picture of the current status of educational research. This was recognized in the original plan. Phase II of the project will attempt to get comparable data from all institutions that grant a doctorate in education. The pilot study was done to obtain an idea of points that might be significant within the domain of educational research, and to explore feasible means of obtaining comparable data.

Outstanding institutions were selected in order to observe the state of the practice at its best. The complacency observed was disturbing. To be sure, there were many examples of capable and dedicated workers. However, the nondiscriminating kinds of activities currently carried on under the name of educational research tend to bury these with the mediocre.

The physical, biological, medical, and agricultural sciences have recognized that their effectiveness is based on a constant harvest of new knowledge. Innovations are systematically developed from an ever increasing body of knowledge and rigorously tested for effectiveness. Contrast this with the usual practice in education. The plain fact is that the formula of innovation by accidental discovery or improvisation is completely antiquated.

Historically, the older sciences began and were supported for centuries by the work of amateurs. Their significant period of growth, however, began only when the amateur ceased to play the major role. Adding to the basic fund of knowledge in education is rapidly approaching the stage where casual part-time effort is not enough. Education will begin to approach its proper level of efficiency only when we recognize that the problems of effectiveness are scientific and technical, not political. Only by inspired, sustained, and systematic research in education similar to that which has graced the older sciences can education become truly effective. In that research the membership of Phi Delta Kappa must be prepared to play a proud part.